

What is claimed is:

1 1. An optical communication system for amplifying an
2 optical signal propagating through an optical transmission line
3 by using an optical amplifier in an optical repeater and emitting
4 an amplified optical signal to an optical transmission line
5 mounted at a back stage comprising:

6 a transmission line compensating device to generate control
7 light for producing a Raman amplification effect within said
8 optical transmission line based on a control signal superimposed
9 on said optical signal.

1 2. The optical communication system according to Claim
2 1, wherein said transmission line compensating device is so
3 configured as to send said control light to an optical
4 transmission line mounted at a front stage.

1 3. The optical communication system according to Claim
2 1, wherein said transmission line compensating device is so
3 configured as to send said control light to said optical
4 transmission line mounted at said back stage.

1 4. The optical communication system according to Claim
2 1, wherein said transmission line compensating device is mounted
3 inside said optical repeater.

1 5. The optical communication system according to Claim
2 1, wherein said transmission line compensating device is
3 separately and individually outside said optical repeater.

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1 6. The optical communication system according to Claim
2 1, wherein said transmission line compensating device includes
3 two or more control light sources to generate control light having
4 a different wavelength and output and an optical multiplexer to
5 multiplex said control light fed from said two or more control
6 light sources.

1 7. An optical communication system for amplifying an
2 optical signal propagating through an upward transmission line
3 or a downward transmission line by using a corresponding optical
4 amplifier in an optical repeater and sending an amplified optical
5 signal to an upward transmission line or a downward transmission
6 line mounted at a back stage comprising:
7 transmission line compensating devices each operating for
8 said upward transmission line or said downward transmission line
9 and each generating, based on a control signal superimposed on
10 said optical signal, control light which causes a Raman
11 amplification effect in said optical transmission lines.

1 8. The optical communication system according to Claim
2 7, wherein said transmission line compensating devices are so
3 configured as to send said control light to optical transmission
4 lines mounted at a front stage.

1 9. The optical communication system according to Claim
2 7, wherein said transmission line compensating devices are so
3 configured as to send said control light to said optical
4 transmission lines mounted at sid back stage.

1 10. The optical communication system according to Claim
2 7, wherein said transmission line compensating devices are
3 mounted inside said optical repeater.

1 11. The optical communication system according to Claim
2 7, wherein said transmission line compensating devices are
3 separately and individually mounted outside said optical
4 repeater.

1 12. The optical communication system according to Claim
2 7, wherein said transmission line compensating devices include
3 two or more control light sources to generate control light having
4 a different wavelength and output and an optical multiplexer to
5 multiplex said control light fed from said two or more control
6 light sources.

1 13. The optical communication system according to Claim
2 7, further comprising common circuits each controlling
3 simultaneously said transmission line compensating devices each
4 operating to correspond to said upward transmission line or said
5 downward transmission line.

1 14. An optical repeater for amplifying an optical signal
2 propagating through an optical transmission line by using an
3 optical amplifier and sending an amplified optical signal to an
4 optical transmission line mounted at a back stage comprising:
5 a transmission line compensating device to generate, based
6 on a control signal superimposed on said optical signal, control
7 light which causes a Raman amplification effect within said

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8 optical transmission line.

1 15. The optical repeater according to Claim 14, wherein
2 said transmission line compensating device is so configured as
3 to send said control light to an optical transmission line mounted
4 at a front stage.

1 16. The optical repeater according to Claim 14, wherein
2 said transmission line compensating device is so configured as
3 to send said control light to said optical transmission line
4 mounted at a back stage.

1 17. The optical repeater according to Claim 14, wherein
2 said transmission line compensating device is mounted inside said
3 optical repeater.

1 18. The optical repeater according to Claim 14, wherein
2 said transmission line compensating device is separately and
3 individually mounted outside said optical repeater.

1 19. The optical repeater according to Claim 14, said
2 transmission line compensating device includes two or more
3 control sources to generate control light having a different
4 wavelength and output and an optical multiplexer to multiplex said
5 control light fed from said two or more control light sources.

1 20. An optical repeater for amplifying an optical signal
2 propagating through an upward transmission line or a downward
3 transmission line by using a corresponding optical amplifier and

4 sending an amplified optical signal to an upward transmission line
5 mounted at a back stage or a downward transmission line mounted
6 at a back stage comprising:
7 transmission line compensating devices each operating for
8 said upward transmission line or said downward transmission line
9 and each generating, based on a control signal superimposed on
10 said optical signal, control light which produces a Raman
11 amplification effect within said upward transmission line or said
12 downward transmission line.

1 21. The optical repeater according to Claim 20, wherein
2 said transmission line compensating devices are so configured as
3 to send said control light to an optical transmission line mounted
4 at a front stage.

1 22. The optical repeater according to Claim 20, wherein
2 said transmission line compensating devices are so configured as
3 to send said control light to said optical transmission line
4 mounted at said back stage.

1 23. The optical repeater according to Claim 20, wherein
2 said transmission line compensating devices are mounted inside
3 said optical repeater.

1 24. The optical repeater according to Claim 20, wherein
2 said transmission line compensating devices are separately and
3 individually mounted outside said optical repeater.

1 25. The optical repeater according to Claim 20, said

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2 transmission line compensating devices includes two or more
3 control sources to generate control light having a different
4 wavelength and output and an optical multiplexer to multiplex said
5 control light fed from said two or more control light sources.

1 26. The optical repeater according to Claim 20, further
2 comprising common circuits each controlling simultaneously said
3 transmission line compensating devices each operating to
4 correspond to said upward transmission line or said downward
5 transmission line.

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